

Claims

What is claimed is:

1. A method for manufacturing a semiconductor device including electrodes, a plurality of protrusions which protrude higher than the electrodes and which are made of a resin in a predetermined pattern, and conductive layers which are electrically connected to the electrodes and which cover top surfaces of the protrusions, the method comprising the steps of:

applying a layer of the resin to the semiconductor device except for the electrodes;
patterning the conductive layers on the electrodes and the layer of the resin in accordance with a predetermined pattern of the protrusions; and

removing the layer of the resin located between the conductive layers by the use of the patterned conductive layers as masks, so as to form the protrusions.

2. The method for manufacturing a semiconductor device according to Claim 1, wherein the layer of the resin is removed by plasma processing.

3. The method for manufacturing a semiconductor device according to Claim 1, wherein the conductive layers are formed by sputtering.

4. The method for manufacturing a semiconductor device according to Claim 1, wherein the conductive layers are formed by plating.

5. The method for manufacturing a semiconductor device according to Claim 1, wherein the step of patterning the conductive layers comprises the sub-steps of:

forming first conductive layers covering the electrodes before the layer of the resin

is formed; and

forming second conductive layers which are connected to the first conductive layers and which cover a top surface of the layer of the resin.

6. The method for manufacturing a semiconductor device according to Claim 5, wherein the first conductive layers are formed by electroless nickel plating.

7. A semiconductor device manufactured by the method for manufacturing a semiconductor device according to Claim 1.

8. The semiconductor device according to Claim 7, comprising:
a plurality of electrodes which are aligned with a predetermined pitch and which have openings;

a plurality of protrusions which are made of a resin and which are disposed in regions except immediately above the openings of the electrodes with the same pitch as that of the electrodes; and

conductive layers which are electrically connected to the electrodes through the openings and which cover the top surfaces of the protrusions.

9. The semiconductor device according to Claim 8, wherein the protrusions are disposed outside an active surface region.

10. The semiconductor device according to Claim 8, wherein the conductive layer comprises a first conductive layer electrically connected to the electrode and a second conductive layer which is connected to the first conductive layer and which covers

the top surface of the layer of the resin.

11. A circuit substrate comprising the semiconductor device according to Claim 7.

12. An electro-optical apparatus comprising:
an electro-optical panel; and
the semiconductor device according to Claim 7, electrically connected to the electro-optical panel.

13. Electronic equipment comprising the electro-optical apparatus according to Claim 12.